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ABSTRACT

Conjoint retention and confluency are examined as psychological and pedagogical principles for use in instruction in English as a Second Language (ESL) when maps are used as facilitators. The theory of conjoint retention states that dual encoding occurs when a person hears or reads a narrative while simultaneously viewing a map containing narrative referents, and that this encoding improves recall of elements from either the narrative or the map. Confluent methodology, part of the humanistic approach to education, promotes integration of cognitive and affective aspects of learning. It is proposed that confluent methods of instruction can take advantage of the affective and empathic qualities inherent in maps and their use. These qualities and the aspects of map information processing that may be amenable to confluency and contribute to language teaching are examined in some detail, and 31 classroom activities incorporating maps in ESL instruction are outlined. The activities include games, listening, reading, and speaking practice, and investigative, descriptive, and reflective exercises. A 73-item bibliography is included. (MSE)

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ESL INSTRUCTION USING MAPS, CONJOINT RETENTION, AND CONFLUENCY

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Abstract

This paper identifies the potential value of both conjoint retention and confluent methodology in the teaching of English as a second language (ESL) when maps are used as facilitators. The probable benefits of various visuospatial encoding processes are explored as related to simultaneity with language encoding. Affective advantages in confluency are indicated, especially experiential and motivational attributes. Methodological limitations are discussed. The limitations in appropriate materials for conjoint retention are examined as are the possibilities in substituting for mimetic or iconic maps. The hypothesis is advanced that quasi-iconic or partially iconic maps may have a measure of conjoint retention potential that is supportive of language instruction. Student learning activities are suggested to relate use of maps to language acquisition. Instructors of English as a second language are urged to try methods suggested here for both conjoint retention and confluency and to report results.

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ESL INSTRUCTION USING MAPS, CONJOINT RETENTION, AND CONFLUENCY

Harry O. Davis

This paper presents a brief examination of conjoint retention and confluency as psychological and pedagogical models. Each is examined in the context of potential English as second language teaching methodology incorporating maps. Secondly, a variety of ESL teaching activities are suggested from the author's perspective as a map librarian.

The operative hypothesis is that both conjoint retention and confluent methodology should be amenable to effective ESL instruction. The one (conjoint retention) is directly related to maps in its theoretical grounding and the other (confluency) can benefit from affective and empathic qualities inherent in maps and their use.

Conjoint retention has been examined sufficiently in the professional literature to permit a considerable measure of validation and an opportunity to move from theory to application possibilities. Confluent methodology has limited representation in the literature (at least so termed), but the basic tenets of the methodology are relevant to ESL needs. Importantly, the two would seem to offer potential in being used together in certain class activities.

This paper indicates the utility and probable value of activities incorporating maps in ESL instruction. (What is said in an ESL context may be generally true for other foreign language study.) There is a need for ESL instructors and researchers to evaluate the value of such activities in achieving improvement in second language learning. The suggested activities can offer approaches to language acquisition even if not yet fully tested as a teaching methodology and instructors are encouraged to use conjoint retention and confluency even if not as a rigorously controlled experiment. At a minimum the motivational aspects of affective confluency should be

beneficial and conjoint retention can yield observable, if not measured, benefits. At the same time, controlled research experiments are needed to understand better any instructional benefits realizable through confluency and conjoint retention and one purpose of this paper is to stimulate such research.

Conjoint Retention

The conjoint retention hypothesis was first stated under that name by Kulhavy, Lee, and Caterino in 1985,[1] although the elements of the model had been indicated earlier by various authors. Antecedent research includes that of Reynolds (1966),[2,3] Paivio (1971),[4] Stasz and Thorndyke,[5] Dean and Kulhavy (1981),[6] Schwartz and Kulhavy (1981),[7] and Kulhavy, Schwartz, and Shaha(1982).[8] This hypothesis states that dual encoding occurs when a person reads or hears a narrative while simultaneously viewing a map containing narrative referents and that this dual encoding subsequently improves recall of elements from either the narrative or the map. As a corollary the hypothesis may apply to situations where a person draws a map while processing the content of a narrative or where a narrative is written or spoken while viewing a map. The hypothesis is that the discourse (narrative) content is stored cognitively in memory as linguistic/verbal elements conjointly with the storage of the perceptual/spatial elements of the map. Conjoint retention is understood to facilitate recall of either visual or verbal elements from memory code by cross-cueing from the one to the other. In other words, for example, recall of a map element serves as a stimulus to enhance recall of a verbal element. Thus, "two codes are better than one."

Although the model has been refined in subsequent research, the basic hypothesis has been essentially validated through a variety of experiments as reported by, among others, Amlund, Gaffney, and Kulhavy(1985),[9] Dickson, Schrankel, and Kulhavy (1988),[10] Abel and Kulhavy (1989),[11] Kulhavy, Caterino, and Melchiori (1989),[12] Kulhavy, Thornton, Hancock, and Webb (1990),[13] Stader, Webb, White, Kulhavy, and Stock(1990),[14] Peterson, Kulhavy, Stock, and Pridemore (1991),[15] Winn (1991),[16] and Kulhavy, Stock, Peterson, Pridemore, and Klein (1992).[17] Other, related

research includes that by Kulhavy and Schwartz(1980),[18] Thorndyke and Stasz(1980),[19] Perrig and Kintsch(1985),[20] Pezdek, Roman, and Sobolik(1986),[21] Gilhooly, Wood, Kinnear, and Green(1988),[22] Schwartz and Kulhavy(1988),[23] Denis and Denhiere(1990),[24] and Schwartz and Phillippe(1991).[25]

A number of findings indicated by these studies may be generalized here for their potential significance in language teaching design.

- Almost all studies related to conjoint retention and map encoding indicate the significance of spatiality in maps.[26,27]

- A narrative description is a better linguistic/verbal stimulus to memory recall than is a structural or geographic description.[28] Stated differently, a verbal description of an area cannot substitute for looking at a map of the area, but this needs to occur conjointly with reading or hearing a narrative which contains map referents.

- For conjoint retention to be effective the map features referred to in the narrative should occur within the areal domain of the map, not as lists outside the framework of the map.[29,30]

- The general position is that memory recall from mimetic maps or those with iconic representation of features is much greater from those without such characteristics.[31,32] Winn, on the other hand, indicates that icons are sometimes more detrimental than helpful.[33,34]

- All maps have "interpretive frameworks" as discerned by the viewer, be these the edges of the map, the neatline, gridlines, or internal delineations such as those provided by political boundaries, street and road patterns, or physical units observable on the map. These edges or boundaries provide reference markers to assist in encoding map content and location and in improving conjoint retention recall.[35,36] Winn cites the importance of the interpretive framework in conjunction with the total configuration of map features and the

encoding advantages of clustering and "chunking" components.[37]

- Not all map features will be encoded equally in importance and Winn indicates that the "perceptual precedence" may favor the relative dominance of feature size, isolation, or color; likewise, the overall size of the map may affect encoding quality and, hence, recall.[38] The optimal dominance or precedence for maps is not empirically established and may vary with viewers, but it may be hypothesized that encoding is enhanced where visual perception is more fully captured or sustained by higher levels of attention and comfort. Conjoint retention is probably more successful with small or moderate-sized maps with bold but comfortable colors and relatively even and open feature distribution; cluttered or "busy" maps may be less successful unless clustering or chunking is feasible.

- Various procedures or strategies may be used in encoding a map and some may be more relevant to conjoint retention because of their congruence with the associated narrative. Relational encoding, pattern encoding, and directional encoding (as presented by Gilhooly, et al[39]), relate to clustering and chunking of attributes and may be congruent with narrative components or sequences.

- Abel and Kulhavy emphasize that instructional materials need to be designed so that maps present information that is supplementary, not redundant, to prose content.[40]

- Conjoint retention is apparently achievable when a map is constructed, completed, or read in conjunction with the reading, hearing, or writing of a related text. The more usual experimental situation has been the reading or hearing of a narrative while viewing a map with the necessary prose features represented. There may be an advantage to dual encoding when a passage can be heard (instead of being read) while viewing a map, since the simultaneity of visuospatial and semantic encoding is greatly increased. (Note, however, the different finding of Abel and Kulhavy, 1986.[41]) Both Dickson and Winn speak favorably of benefits to be derived in map drawing as support to spatial encoding.[42,43] Winn finds utility

in having students construct or complete parts of a map in what he terms "effortful elaboration."

- Maps may facilitate both mnemonic and instantiation processes, with the first assisting in memory of easy-to-understand but difficult-to-remember concepts or names and the second facilitating an understanding of the abstract by a concrete exemplar, including map features. These relate to conjoint retention as recall processes.[44]

- Although this paper assumes an essentially gender-free position, there are significant gender differences in map processing reported by, among others, Perrig and Kintsch[45] and by Schwartz and Phillipe.[46] Perrig and Kintsch differentiate between propositional and situational narratives and the relative qualities of each, which could, in turn, influence text chosen for conjoint retention use.

In essence, conjoint retention is achieved only when a map and a narrative or text are studied or otherwise processed together, when each contains information not contained by the other, but also when each has referents to the other. Recall success seems more likely with moderate-size maps with simplified, easier-to-read cartography using pictorial, iconic, or other mimetic representations of reality, although an internal interpretative framework may assist with component clustering or chunking in memory even when the feature representation is not iconic.

Confluent Methodology

Confluent education has its origin in studies at the University of California, Santa Barbara, in the 1960s, resulting in the 1971 publication of Human Teaching for Human Learning by George I. Brown[47]. Part of the humanist tradition in education and drawing on Gestalt therapy, confluent education (or confluency) promotes integration of the cognitive and the affective in learning structure.[48] A general summary of confluent pedagogy is provided by Brown, Phillips, and Shapiro (1976)[49]. Additional perspective can be gained from Martin (1989)[50], Moheno (1989)[51], Perrin (1984)[52] and Whitlock (1984)[53] who indicate characteristics of affective and confluent education. Martin is particularly

useful in describing stages of internalization in affective learning and in describing the relationship between affective and cognitive behavior.

Much of affective and humanistic education is outside the concern of this paper. The interest here is not with self-development, emotional clarification, needs assessment, social competence, and so forth, important as these may be. The aspect of confluency which is attractive here is the convergency and the motivational advantage in utilizing a student's prior background and knowledge together with his or her current values and interests in language study and with maps acting as facilitators. The perspective is both experiential and motivational. The premise is that a language student is advantaged if the mode of instruction recognizes what he or she knows and values or wants to come to know and appreciate or understand. This is identified by Stancato and Hamachek (1990) who advocate teaching "...cognitive subject matter in connection with the student's background, interest, and prior knowledge."[54]

No literature has been identified which addresses the specific value of using maps in a confluent model for language instruction. There seems, in fact, to have been rather limited use of confluency for any language instruction. The principal proponent of confluent language instruction has been Beverly Galyean, who identified four key processes for confluency in the language classroom:

> "(1) language practice immersed in the 'here and now' reality of class interaction; (2) content of language practice based upon student-offered material, both cognitive (ideas, thoughts, facts) and affective (feelings, personal images, values, interests);(3) close relationships established among class members; (4) self-reflection and self-disclosure encouraged as a means of self-knowledge."[55]

Additional insight may be gained from Inman,[56] Moskowitz (1978),[57] and Yoshikawa (1982).[58]

Conjoint retention stands apart as a theory, having unique elements not found in other hypotheses. By contrast, many language acquisition theories and teaching models have certain elements in common albeit with a wide array of

terminology. Of the various theories which can be related or compared to confluent methodology, Krashen's second language acquisition theories are of particular interest.[59,60] In general, the position taken in this paper recognizes language acquisition through communicative and contextualized activities and this agrees, at least in part, with Krashen's acquisition-learning and input hypotheses.

Particularly significant is Krashen's "affective filter" hypothesis which relates to how anxiety and motivation affect language acquisition.[61] Students with a "high" affective filter will have lowered receptivity to language acquisition, while a low filter permits greater language input. This relates to confluency's affective goal to increase relevance and motivation which would lower the affective filter level and increase the language acquisition potential.

Pedagogical Perspective

Maps are integral to the process of conjoint retention. Maps can be used as facilitators in confluent education. In many instances (but certainly not all) maps can facilitate confluency and conjoint retention concurrently in a given learning exercise.

The advantage to language instruction in conjoint retention memory recall is not in the recall for map or narrative content per se. Such results are acceptable, especially if they provide motivation for transparent learning advantages, but the main focus is on language acquisition, not geography or facts or a narrative from the text. The hypothesis must be that conjoint retention will facilitate language acquisition, verbally and semantically, as discrete word entities or grammatically and contextually in phrases and sentences. The learning value is not innate in the given narrative but in the transfer value which allows elements in a text to be replicated properly in the same or a different context. A first goal can be vocabulary acquisition and a second the capacity to more fully achieve written and spoken use of English as a second language. This hypothetical perspective needs to be tested experimentally to understand better its merits and deficiencies. On the other hand, the conjoint retention

model is sufficiently validated to encourage teachers to use the model in an instructional mode, reporting their own trial-and-error results in the literature. Possible activities for the classroom are suggested below.

Although the many experiments used to test and extend the conjoint retention hypothesis have used actual classroom settings, the situations generally have been artificial in the sense of not being integral to actual curriculum units or to a continuing methodology. There seems to be virtually no indication of a direct, integrated application of conjoint retention to a teaching/learning unit. Several of the works cited above refer to instructional application, but then fail to do so in any concrete fashion. Schwartz (1988), in writing about "implications for instruction" in cognitive processing, summarizes conjoint retention and related research, but provides only passing reference to the use of maps in geography and the social studies.[62] Much remains to be done in examining the practical application of conjoint retention to curriculum design.

Confluent education is not dependent on the use of maps, as in the case of conjoint retention, but maps can certainly have a role in confluency. Maps relate to place and place is a key element in the cognitive and affective orientation of everyone. Consequently, maps can provide a bridge for connecting the affective and cognitive in instruction. Such "connectedness" is an important aspect of confluency. There is a limit to the extent to which maps can and should be used as confluency media, but, at this point, the potential needs greater exploration.

Maps afford excellent opportunities for "look-and-learn" and "show-and-tell" exercises. The ESL student can use maps to aid his or her expression of travel experiences and desires, to discourse about his or her home country, to discuss the local community, and so forth. On the other hand, the instructor can create assignments using maps to achieve specific language acquisition goals. Such instructor-designed, specific goal-oriented exercises may also utilize conjoint retention potentialities as well as confluency, and, with some thought, the two can often be combined. Additionally, there seems to be a natural curiosity about geography on the part of many foreign

students which supports the inclusion of map exercises in the ESL syllabus.

The use of affective elements in the curriculum carries the responsibility to be sensitive to cultural differences among students. The instructor should be alert to possibilities which could offend or embarrass as well as those which might raise political disagreement to the point of being counterproductive to the learning environment.

Unlike conjoint retention which has had virtually no direct, sustained curricular application, confluency has been incorporated into instructional programs, including those for languages (see Galyean[63]). It is not the purpose of this paper to evaluate the success of such programs; to the author's knowledge maps were not part of such programs and this paper seeks to indicate certain potential advantage in the use of maps in language instruction. There are, of course, scattered examples of maps used in foreign language textbooks, generally more for subject interest than for specific language acquisition goals intrinsic in the map content. Such maps may be confluent in their interest-motivating qualities and they may even relate to conjoint retention insofar as discourse relates to the maps, but such qualities may be more coincidental than intentional.

Very few examples can be found where maps are used intentionally as specific facilitators of language learning. One very interesting example is provided by Kullmer, Gerard, and de Martonne in their 1928 publication of Sketch Maps of France, A French Composition Book with Maps - "The Roofed Square-Paris Method."[64] (Originally published, in more abbreviated form, by Kullmer and Cabeen in 1914.[65]) Each chapter is devoted to individual elements of grammar and in each case there is a map with a distinctly related discourse. In effect, the book incorporates the basis of conjoint retention, although the maps are not generally iconic. Most maps used are of the location or itinerary type, but it is interesting that thematic maps are included, as in a map for "Densite de la Population" in the lesson for irregular verbs. In the introduction to the 1928 edition, C. J. Kullmer stresses the value of visual presentations in language instruction and learning. He goes on to state the learning value in map drawing and the requirement of maps in language class examinations.

There are certain potential complications or limitations in the use of maps in language instruction which need consideration. Scale is one, which, in turn, will govern map size. In general, it will probably be better to use smaller or moderate-size maps, so as to minimize visual scanning which may diffuse concentration and limit assimilation of information. Smaller maps should permit greater focus and retention. As for scale itself, all things being equal, larger-scale (more local or detailed) maps will generally permit greater item focus and assimilation. This would be much more important with conjoint retention than with confluency. However, scale must be appropriate to the discourse used in a conjoint retention approach (or confluency, for that matter) and it is the ability of the map to "display the text" that is significant. Kullmer et al, for example, use very small scale maps of France. Overall, size may be more important than scale in the sense that the map should be "manageable" for student use and scale may vary to meet the content need.

Information density on a map is another factor that may influence both student interest and visual encoding. Studies are needed to establish optimal density, but it is probable that the more detailed a map the less easy it will be for a person to read and encode the map. On the other hand, an information-dense map may have content that stimulates and maintains interest and which fits a particular instructional need. Stated differently, minimized information density may be better for conjoint retention applications, but maps used in confluency exercises may be less sensitive to density and, in some cases, may find density to be a learning enhancement. On balance, however, an instructor will probably prefer intermediate to large-scale maps of moderate size without excessive "clutter" or detail. This position may pose a difficulty in identifying iconic maps for instructional use since many of these (especially those for children) are overladen with icons at a small cartographic scale.

The selection of maps for potential confluency exercises is much more open than is true with conjoint retention and the value it places on icons or pictorial representation. Many maps can provide both the affective and congitive relationships needed in confluency, but there

is a much more limited pool of available iconic or mimetic cartography for conjoint retention. Furthermore, many iconic maps do have a "clutter" quality and even dubious accuracy (geographic or otherwise) which should give pause. Additionally, of course, the map used for conjoint retention must be able to relate meaningfully to a related discourse. Iconic maps used thus far in research, for the most part, have been generated uniquely to relate to a particular discourse and this is quite different from using an already published map and using or creating a related discourse. There seems to be little good reason, however, why the latter course should not be a possibility and this opens up new possibilities with conjoint retention.

If confluency is a goal without conjoint retention, then the geography of a map may be of equal or greater significance than scale, size, or information density, although these retain importance. The critical element in confluency is the affective relevance (without sacrifice of cognitive content); the map needs to be one which will stimulate and represent elements important to the student's past, present, or future experience, values, or goals. A wide variety of maps may serve this purpose, although selection should still be undertaken critically, with special attention to whether the theme of the exercise is more focused on one place or geographical unit or whether several places are involved with movement or relationships between them.

The application of conjoint retention to learner recall invokes much stricter requirements since the map must be related to a congruent discourse with mutual referents and the bulk of the experimental literature indicates the value of icons or pictorial representations for the cartographic referents. This will greatly reduce the number of useful maps unless maps are separately generated for classroom needs. Available mapping software allows this possibility, but the concern here is chiefly with available printed cartography.

Sources of iconic cartography include children's maps and atlases, certain national, state, or regional thematic atlases (the examples are sparse), some tourist promotion maps, and occasional separate thematic sheets. Many of the better possibilities will be found in children's materials

and tourist maps, but these may vary widely in quality and applicability. Iconic maps may err in stressing a decorative or "interesting" appearance to the detriment of accuracy and context or cohesion. Clustering or chunking of components may be difficult for relational encoding. Nonetheless, there are conjoint retention learning possibilities with such maps. Some mimetic maps (including axonometric views, oblique perspectives, relief models, shaded relief maps, and pictorial maps of real or imaginary places) may be as useful as iconic maps with greater artificiality and perhaps less amenability to related discourse.

A distinction needs to be made between maps which include pictorial representations and those which are uniformly pictorial. The latter may be as much "picture" as "map" and this type of map may present difficulties for conjoint retention because of a lack of labels for referents, a lack of internal delineation, and a lack of any congruent narrative. Thus, there is a limit to the value of mimeticism. An examination of pictorial maps as presented by Holmes (1991)[66] helps one understand the difference between "pictorial" and "iconic" and how this difference must relate to any application of conjoint retention. Some pictorial maps may be useful for conjoint retention, but many will not. At issue is how referential the map can be for related discourse.

The problem posed by conjoint retention is the need to have both a map and a narrative which relate to each other. Iconic and mimetic maps are in the minority and normally lack an accompanying narrative. Devising a congruent narrative may be too contrived or simply not worth the effort (but not always so). Stated differently, it may be easier to devise (prepare) a map to fit a narrative than to devise a narrative for an existing iconic map. Or better still to use a story illustrated by a map, especially a children's book with a shorter narrative in simple language and an easily understood map with highly relevant referents. More advanced students could use adult books with maps.

Although the experimental literature clearly supports the value if not the absolute necessity for icons in conjoint retention in contrast, for example, to geometric symbols, some map symbols are themselves iconic (a building

symbol with a cross for a church, for example, or crossed picks for a mine). A topographic map contains a mixture of point, area, and line symbols, geometric, linear, pictorial, or iconic. Other maps may include volume symbols. (See Dent, 1985.[67]) We need to ask when a map may be partially valid for conjoint retention, although not iconic in the usual pictorial symbol sense. Must representation be consistent in pictorial shape, size, and form to be iconic? Consider the pronounced blue geometrics of lakes and rivers on a map or the red lines for roads; can these not be construed and encoded as veritable icons? This hypothesis needs testing, but it seems reasonable to posit that mixed iconic/non-iconic maps may have utility in conjoint retention, especially where the possibilities for relational, pattern, or directional encoding are present or when there is significant internal delineation. (See Winn, 1991.[68])

Choropleth maps present significant opportunities for relational or pattern encoding and accompanying histograms or other graphic or symbolic features may contribute to a quasi-iconic situation which may or may not support conjoint retention. The internal delineations of choropleth maps must be recognized as a plus for encoding. Such maps may not always be amenable to interesting narrative, but some may have affective utility for confluency in addition to any conjoint retention possibilities. An example of such a map would be a state map with county borders delineated and with a given qualitative or quantitative variable encoded for each county by color, symbol, pattern, or graphical representation. Fisher provides a very thorough discussion of symbols and areal visualization in thematic cartography (1982).[69]

In the use of maps for language acquisition, the map may support confluency, conjoint retention, or both. In general, it will be more difficult to have related maps and discourse to support conjoint retention, but the potential for language acquisition should be more assured or productive using this method. Confluency, on the other hand, is not empirically established in terms of language recall results, but many maps are available for use and the probability of benefits seems high. If confluency and conjoint retention are used together, then any positive results may be attributable to either or both and it may be

difficult or impossible to know which. Since either method separately or jointly can be expected to improve a student's language acquisition, it is suggested that greater attention be given to lesson organization and choice of materials than to close distinction between confluency and conjoint retention.

A lesson may be organized principally as an exercise in conjoint retention or as one in confluency, allowing for a merging of the two as is desired, advisable, or necessary and the map choice should relate to that orientation. For example, an ESL student from Cameroon whose major interest is agriculture might choose to write a paper or give a class presentation on Cameroonian agriculture. The student could do this using an agricultural map for the Cameroon (as in, for example, the Atlas of the United Republic of the Cameroon.[70]) This would be principally a use of confluency in using a strong interest held by the student while at the same time allowing him or her to exhibit a certain pride in, or commitment to, the native land. But there could also be some conjoint retention in the combination of a map of agriculture and related text, particularly if the map were copied and provided with suitable icons and labels. The map in the atlas cited has strong color differentiation for dominant crop areas and this could contribute to both relational encoding and chunking of attributes.

An exercise more strictly geared to conjoint retention might have the student use a pictorial or iconic map of Africa as found in a children's atlas or an encyclopedia. The student could then be asked to write a short essay about the differences between agriculture in his part of Africa as compared to other parts and with the requirement that he or she make reference to places identified with icons on the map. Obviously there could be an element of confluency here, but the orientation is clearly more to conjoint retention.

The maps used in exercises meant to enhance language acquisition may be categorized as to their general character and their probable use. The simplest would be the outline or base map with only major boundaries and a minimum of other referents. Such maps would find their principal use where the student needed a basic map to which he or she could add their own information, iconic or not. Such maps may be used

as a basis for achieving map drawing advantages inasmuch as they provide part of the drawing and allow the student space to amplify according to confluent or conjoint retention needs.

The next level of sophistication would be represented by the basic reference map where principal political units may be identified, often in color, and only principal cities and other cultural or physical features are identified. These may be issued for continents or countries or various administrative levels, such as states or provinces. They are characterized by minimal but essential information. The country maps issued by the Central Intelligence Agency are prime examples. Such maps would find principal use in confluency exercises as basic reference pieces for student discourse, although they may also function as base maps.

The thematic map will be more complex, either showing geography in greater detail, as with the typical road or street map, or in portraying distribution of a particular attribute or set of attributes, as with, say, a soils map or a map showing median family income by country. Maps of this type will be of use principally for confluency, although a very few may be iconic and many may have quasi-iconic symbolization or pattern structures and hence be amenable to conjoint retention possibilities.

Topographic maps are a special category of thematic map which needs separate consideration. They are important because they are more commonly available and often are the only detailed maps available for a local area. Thus they meet a confluency need not met by any other map and the ESL instructor should not avoid their use even though, cartographically, they are not simple maps. The student should be encouraged to not be concerned with reading the contours on the map, but to think of the map as a basic reference map (which it is). These maps use mimetic symbols and these may be partly iconic and open to limited conjoint retention possibilities, especially in conjunction with relational encoding.

As discussed above, true mimetic, pictorial, and iconic maps as published products are rather uncommon. Their principal use in language instruction will be for conjoint retention, although they may carry confluent qualities as

well. Conjoint retention will require a related discourse and this may be text accompanying the map or it may be text provided by the instructor or one generated by the student.

Finally, there is the self-generated map, one drafted by the instructor or the student, either mechanically or using computer software. As discussed above, certain advantages are believed to accrue from having the student generate the map, but, in any event, such a map allows flexibility in terms of content and it may be used for exercises in either conjoint retention or confluency.

Other categories of maps might be identified as useful, but the preceding groups establish the basic types. The types used by an ESL instructor may be governed by map availability, level of instruction, choice of instructional orientation (preference for conjoint retention or confluency), student preference, and perceived advantages. Additionally, maps will constitute only a portion of the teaching materials used and so the selection of map exercises will be related to competing choices.

Potential Instructional Activities

This section presents a selection of potential ESL teaching and learning activities using maps in conjunction with confluency and/or conjoint retention. The suggestions are meant to be largely generic in character and the instructor is encouraged to modify and adapt as circumstances indicate. Also, some activities incorporate other methodologies, such as cloze exercises, simulation, and gaming, which can act as additional stimuli or facilitators to learning. This list of suggested activities gives emphasis to confluency and takes a liberal position on conjoint retention. The lessened availability of having strongly iconic or mimetic maps is recognized and hypothetical credence is given to quasi-icons together with benefits from such facilitators as interpretive frameworks, relational and pattern encoding, map drawing, and other considerations given above in the discussion of conjoint retention. The list also generalizes the hypothetical value of map viewing or drawing in conjunction with written or spoken discourse without a true or full iconic presence.

The suggested activities listed below are not listed in any order of preference nor are they organized by relationship to confluency or conjoint retention. The instructor is encouraged to modify as appropriate and to document results and value found in any exercise.

(1) Have students read a short children's story book which includes a good map related to the story (books with double-page endpaper maps are useful; these maps are often iconic or mimetic). Then have the students use the map to describe the imaginary place and tell what they like or don't like about the place and the story.

(2) Read a narrative to students while they look at a related map. Then give them a clozed copy of the narrative to complete while they continue to look at the map. Next (perhaps a day later) give them the same clozed narrative (or the same narrative clozed differently) and ask them to complete the narrative without referring to the map.

(3) Ask students to study a map legend and locate examples of the symbols used on the map. Then ask them to write for each symbol a sentence which makes reference to the map in some way. (An option is to use a map published in a non-English language known by the student and have the student first translate the legend to English.)

(4) Have students describe a trip they've made and use a map to illustrate the route described.

(5) Show students a map of Washington, DC, for the area from Capitol Hill to the White House, including the Mall. Ask students to write or tell what they would most like to see there.

(6) Show a student two maps of his or her native country (or continental maps which include the country). Ask the student to indicate which map best portrays his or her native land and why.

(7) Have each student select a map for his home town or region and give a class presentation using the map.

(8) Show students a map depicting an element of history while reading them a narrative about the historical event or

place. Ask the students how the map helps them understand the narrative and ask them to restate portions of the narrative with reference to the map. (Photographs or other illustrations could be incorporated into the activity also.)

(9) Provide an axonometric or bird's eye view map of a major city and ask the students to describe what they see.

(10) Provide students with a map with numbered locations and for each location provide a cloze statement for completion.

(11) Have students describe where they would most like to go if offered a free vacation anywhere in the world (except their home country)--where they would go, how they would travel, and what they would like to see and do. Have them use maps while writing or speaking. (See Austin (1991 for a similar activity).[71]

(12) Have students write a simple travel advertisement or travel promotion sheet for their native countries (or some location therein) and have the students use maps in the process. The students might use base maps of their countries to copy and annotate with their own simple icons and labels.

(13) Have students look at a map while the instructor reads a description of a travel loop whereby one arrives back where one started (but do not reveal this immediately). Ask students where they've arrived. Repeat the loop description but modify so that the trip arrives at a different location and again ask students to indicate where the trip has arrived. Give students a copy of the narratives and ask them to make a list of the nouns, verbs, and adjectives most important to understanding the travel described. Then ask them to use these words in sentences of their own.

(14) Provide each student with a map with numbered points. Ask the students to describe how to move from point to point and what they might like to do at any given point.

(15) Provide students with a list of places named after U. S. Presidents plus an indexed map so that they can locate the places (or, alternatively, show them a map marked for the places). Have students describe where the place is and what it is (town, river, mountain, or whatever). They might

also use an encyclopedia or other reference source and write a short summary of the President's life.

(16) Draw a route on a map. Ask students to write a narrative about using this route for a trip and/or have a student describe the trip while all students look at the map. Alternatively, indicate two cities on a map which are at least 500 miles apart. Ask the students to describe their travel preference; would they prefer to travel between the two cities by auto, train, or plane and why. Have them use a map to describe the route. Have students try to persuade other students of their preference.

(17) Give students a map which has various locations numbered or otherwise marked. Use a wide variety of features such as towns, mountains, glaciers, swamps, beaches, cemeteries, factories, schools, airports, bridges, rivers, et cetera. Ask students to write a simple descriptive sentence about each marked feature, i.e., what they would see or experience if they were at that location.

(18) Show students a colorful geologic map and ask each student to describe what they see and what they like or dislike about the map. Alternative: provide two or three maps and request an aesthetic comparison. More advanced students could use the legend and attempt to indicate some of what the map portrays. Students could be asked to compile a list of the nouns and adjectives which the maps suggest to them and then use those words in sentences.

(19) Give students maps of two different towns or cities for which they probably have no prior bias. Ask them to compare the two cities based on map evidence only and to indicate in a short essay in which one they would prefer to live and why. (There should be some contrast between the towns as revealed by the maps.)

(20) Have a student use a map to describe the course of a river (one not too long). Choose a river with variations over its course or compare two different rivers so as to represent straight vs. meandering, narrow vs. wide, with islands vs. without, and so forth. Ask the student to give attention to the stream's source, mouth, major inflowing streams, political boundaries following the stream's course, and features such as towns adjacent to the stream. Have the

student compile a word list from what is seen and then write a sentence using each word.

(21) Have students view a pair of aerial photographs stereoscopically and record their observations and feelings. Use a pair which yields a pronounced three-dimensional effect, such as that for a volcano or a deep canyon.

(22) Show students a National Geographic map with embedded or accompanying text which they are to read in addition to studying the map. Remove the map and text and have the students complete clozed sentences extracted from the map text.

(23) Have students use a map (and perhaps travel literature) to write a narrative describing travel to a national park of their choice. They should describe the route of travel, what they might see on the way, and what they would like to do at the park. Have the students present the narrative to their class using the map for illustration.

(24) Mystery Destination Game. Have all students use a road map for the same state. Give each student a card with the same number of directions (four to six) for each student. The destination can be the same for each student or different, but all should have the same starting point. The directions should be simple, like: "Go north from the starting point to the first town whose name begins with a "B" and then go east three inches on the map to Highway 200; go north until the road crosses a railroad and then turn right at the first numbered highway; go until you come to a lake on the south side of the road. Where are you?" The winner is the first to correctly identify his location, but, hopefully there will be as much fun and learning as "winning."

(25) Assemble some pictorial maps from travel literature and ask students to pick their favorites and write a narrative referring to the map. Then have them read their narratives to the class while others view the map.

(26) Have students pick an area and a subject which is of interest to them and then (if available) have them study choropleth maps for their choices. Ask the student to write a paragraph describing what he has learned from the map. Or

have the students use base maps to add data that they have obtained from reference sources.

(27) Have students visualize a fantasy land or imaginary place that they believe would be "peaceful" or fun" and then have them draw a rudimentary map with at least eight features identified by labeled icons. Then have them write a short narrative describing the place, using the iconic labels in the text.

(28) Have students complete a cloze exercise which must include referents from a map provided for their use. This may consist of a cloze narrative or of numbered, non-narrative statements. An example might begin: "From Paris I went approximately [number] miles to [place] where I visited for [time]. This place was [adjective] and the people were [adjective]. I enjoyed the [noun]+[adverb] and I [verb] the [noun]. [Et cetera.]

(29) Show students a raised relief map and ask them to describe what they see and feel about the area. Ask them to describe hiking or driving from Point A to Point B. Ask them whether it would be easier to travel from Point P to Point Q or Point R.

(30) Ask each student to draw and label (with icons or pictures if they are willing and able) a map which illustrates a happy time in their life. Ask them to share this with the class. Ask them to make a list of "happy words" and ask them to use them in new sentences.

(31) Krashen[72] and Wharton[73] each describe a language learning game using a map depicting city streets and labeled buildings. Two forms of the map are used with all streets labeled on both maps but with one map having one set of buldings labeled and the other map having the other buidings named. One student has one map and another student the other map and they take turns trying to guide each other to the buildings named on their version of the map but not labeled on the map of the student to whom they give direcitons. The object is for each student to get all unlabeled buildings properly labeled.The two versions of the game are nearly identical, but Krashen provides illustrations of the actual maps to be used. It is also worth noting that Krashen advocates the use of "real" maps

whenever possible and he finds particular value in tourist maps.

Summary

This paper has identified the potential value of both conjoint retention and confluent methodology in the teaching of English when maps are used as facilitators. Methodological limitations include a shortage of appropriate materials for conjoint retention and alternatives need to be considered. The hypothesis has been advanced, without empirical testing at this point, that quasi-iconic or partially iconic maps may allow a measure of conjoint retention that is supportive in language topics explored in this paper. Teaching activities are suggested as examples of means to utilize maps in ESL instruction. Instructors of English as a second language are urged to try methods suggested here both for conjoint retention and confluency and to report results. Researchers are invited to critique the ideas presented here and to seek evidence for adjustments to the positions taken.

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